Soils-Habit-Plants

16mm film, 11 minutes, Japan 2017

A plant contemplates by contracting the elements from which it originates — light, carbon, and the salts — and it fills itself with colors and odors that in each case qualify its variety, its composition: it is sensation in itself.

Gilles Deleuze and Félix Guattari, *What is Philosophy?* (1994)

Habit introduces duration into the concept of contraction through which plants create themselves. Habitat then is a space where plants contemplate. The habit of a plant or a stone is an anticipation that it will continue to contract and contemplate the elements from which it emerges.

The three **plants** in the film are typical for landscapes shared between humans and nonhumans. Despite their widespread and ubiquitous status, they can be called "fringe" species. This implies, that they neither belong to a "wilderness", nor to "culture". They upset easy categorization of "useful" and "useless" species and create contradictions in representations of the landscape.

Wild millet is an archetype of the domesticated Japanese barnyard millet. According to a widespread conviction wild millet is a weed. As a weed, it is typical for patches of disturbed land. Hence, this plant has been accompanying human activities since early times. Often to be found in the neighborhood of rice, millet perhaps originated from an environment, similar to the one from which rice was domesticated. Despite their habitual similarities, wild millet receives exceptionally negative attention. While the rice is romanticized, wild millet is always discriminated and weeded as a pest. However, one might understand wild millet as a disturbance of the rice fields' monoculture, and thereby as an agent of biodiversity. The presence of wild millet in rice fields reminds that until 1880 its "cultivated" relative was a staple crop in Japan, which disappeared as a victim of modernization and switch to monoculture agriculture.

What is truly interesting about the plant, is its amazing robustness and adaptability to weeding: during the centuries of cohabitation with rice it developed a mimicry to a rice plant, which allowed it to stay unnoticed by the cultivators at the times of hand weeding. Nowadays it demonstrates high resistance to chemical herbicides. Such qualities give hope that this wild variety will persist on its own, unlike the domesticated variety, which presently is on the verge of extinction due to economic conjunctures. As long as the wild variety persists, it maintains an opportunity for us to re-domesticate it in case the domestic variety is totally gone.

Japanese knotweed is also a usual neighbor of people's habitats in Japan. This ubiquitous Japanese plant is currently referred to as an invasive species in the UK and some areas of the US. The category of ecological invasiveness has become a commonplace notion. For example, the state policy of Japan in regards of biodiversity outlines invasiveness as a driving factor behind the contemporary ecological crisis. However, invasiveness is a quite confused notion. If invasive species are defined as threatening local diversity by establishing a monoculture in its place, the correspondence to conventional agriculture is surprising notable. Hence, if Japanese knotweed as an introduced invasive species extinguishing English plant communities, than wheat, for example, can be regarded an invasive species introduced from Middle East, which has destroyed the steppe of Russia and Ukraine.

Just like the status of the plants depends on the cultural context in which they grow, the concept of invasiveness can't be objective. In the 1970s in the UK plantations of Japanese knotweed were established. The idea was to use this highly productive plant for animal fodder. As one can see, the economical context often decides the ecological status.

In the beginning of the film one sees a plantation of Japanese cedar and Hinoki cypress. These plantations are currently investigated for their adverse ecological and health related effects. However, their sheer scale, grandeur and monumental presence are astonishing. Established in the after war years, desired and welcomed during the time of economic growth in the late 1950s and early 1960s, nowadays many of these forests appear as shadows of old desires and believes in economic prosperity.

The photograph placed on the forest floor was made in Sarawak, Borneo. It was taken when Sarawak was a British colony in a by now logged down primary forest. Many Japanese cedar and Hinoki cypress plantations were abandoned due to the shift of economic policy, occurring throughout the 1960s, which privileged investments in extraction of cheap foreign natural resources from Philippines, Indonesia and Malaysia.

Nearly all environments, ecological, social and mental, are highly under stress. The actual and the impending massive loss of species and diversity are emotionally and rationally hard to grasp. But not only plants and animals, also **soil** is under threat. If soil is damaged, in example plowed, it releases carbon dioxide into the atmosphere. This has the same consequence as the burning of fossil fuels.

This process creates a lack of carbon in the soil. Most agricultural land has lost 50% to 70% of its carbon storages according to the soil scientist Rattan Lal. Plants capture carbon in their leaves, pump it down into their root, and exude it into the soil, feeding microorganisms. Carbon rich soil acts like a sponge, absorbing water, and giving it back to the plants when needed.

Soil and biodiversity are strongly interconnected. Soil sustains plants, perpetuating the lives of animals and humans. 95% of what we eat needs soil to grow. Besides providing diverse "ecological services", soil accommodates an innumerable, and basically unmapped, diversity of microorganism. In one hand full of soil, there are more organisms than there are people on earth. Only the vast amount of stars can hold up against such figures. Soil organisms like nematodes, protists, fungi and bacteria are great collaborators. Their multispecies network produces all the nutrition plants require and the lives of animals and humans rely on. Though microorganisms still need complex environments to flourish.

Sixty years of industrialized agriculture, the so-called "green revolution" with its constant mechanical and chemical treatments, its use of fertilizers, herbicides and pesticides, have left soil in a very poor condition. It killed many microbial companions.

There are many ways to feed microbes and to storage carbon in the soil. The most popular is called “no-tillage farming”, which involves planting without plowing. A contemporary pioneer of natural farming was the Japanese microbiologist and farmer Masanobu Fukuoka.

The Japanese company DGC Technologies tests soil microbial vitality and biodiversity on a commercial scale for local and international farmers who want to improve or advertise their soil condition.

In the film one sees micro test plates, each containing 95 compartments, filled with different kinds of liquid carbon. The plates are used to understand how many microbes inhabit the soil. If microorganisms feed off from the carbon, the liquid becomes colored. The more colors have changed the more different microorganism are present in the soil. The faster the color changes, the higher is the vitality of the microorganisms. Soil was collected from three locations: an urban garden with a diverse range of vegetables, weeds and wild millet; a monoculture plantation of Japanese cedar and Hinoki cypress; and a secondary mixed forest mainly populated with oaks and bamboo grass. The mixed vegetable garden was outstanding, with an average of 1.1 million active bacteria per 1g of soil. The tree plantation showed an average of 0.8 million microorganisms per 1g. The secondary forest showed only 0.6 million microbial inhabitants per 1g. According to Naomi Sakuramoto from the soil lab, the bad result of the secondary forest probably was due to the high presence of oak and bamboo grass, who like to live together, but prevent other species growth. However, one needs to bear in mind that only 1% of the bacteria in soil is measurable, meaning 99% of the billions and more microorganism are not accessible to science.

Microorganisms might suffer from agrochemicals and monocultures, however they can be very resistant. They survive, according to Sakuramoto, for example high radioactivity. They constantly evolve and uptake other species genetic material while still remaining independent entities. Their history is much older and will continue, when human history has ended.

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a film by Mikhail Lylov and Elke Marhöfer

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Flowers on the table:

look at this mountain – once it was fire

by Elke Marhöfer 2017

soil, fern, pink pineapple, ceramics

One Day Stand

by Mikhail Lylov, 2017

clay vase, petalite glaze, engobe brushwork, stinging nettle, bamboo grass